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POTATO GROWING AS CLUB WORK IN THE NORTH AND WEST.

By WILLIAM STUART, *Horticulturist*.

INTRODUCTION.¹

The following suggestions on the cultivation of the potato are intended for those who wish to grow potatoes in connection with club work or for home use. The instructions are brief and somewhat general in their application to the 36 States within this territory. It is suggested that club members write to State experiment stations for added information in regard to the more local problems of successful potato culture.

SELECTION OF THE CLUB PLAT.

In the selection of the club plat keep the following points in mind:

(a) Ease of access. Have the potato plat as near the house as possible. Time saved is money earned.

(b) When available choose a gravelly or sandy loam soil. Any soil, except a very light sandy or stiff clay soil, if reasonably well supplied with moisture will grow good potatoes.

¹These suggestions and instructions on the growing and management of a crop of potatoes have been prepared especially for the boy and girl potato-club members in the Northern, North Central, and Western States, and were requested by the Specialist in Charge of Club Work for the Office of Farm Management and for the above-named territory.

Write to the United States Department of Agriculture, Division of Publications, Washington, D. C., for Farmers' Bulletins 35, 91, 295, 324, 386, 407, and 410, and Bureau of Plant Industry Circular No. 113. These will give you much assistance in working out the problems of your club plat.

Do not fail to keep this circular, together with your club crop-report blank, in a convenient place so that you can review, study their contents, and keep your club records complete throughout the season. Enter all items of interest on your potato club crop-report blank, Form O-3. If you do not have a copy of this blank write at once to the Office of Farm Management, Department of Agriculture, Washington, D. C., for a copy.

(c) A clover, alfalfa, or old pasture sod is very desirable because it insures a better supply of moisture and plant food and a more friable, porous soil.

(d) A plat of land 24 by 227 feet contains approximately one-eighth acre. This width allows 9 rows of 32 inches or 8 rows of 36 inches.

VARIETY OF PLANT.

Select the variety that does best in your neighborhood. If there are no acceptable varieties grown, ask your State experiment station or the United States Department of Agriculture for suggestions. The early varieties most generally grown in the North are the Irish Cobbler and Extra Early Eureka. The Green Mountain, Rural New Yorker No. 2, Sir Walter Raleigh, and Carman No. 3 comprise the most common late varieties. In the West the Early Ohio, Early Michigan, and Early Acme are more generally grown among the early varieties and the Carman No. 3, Sir Walter Raleigh, Rural New Yorker No. 2, Pearl, Peerless, and Burbank, among the late.

PREPARATION OF THE LAND.

Plow clover or pasture sod deeply, 8 inches or more, in the fall. If seriously baked in the spring, replot. Thoroughly fit the land with disk or cutaway harrow and drag with smoothing harrow until a fine surface has been secured.

Plow alfalfa lightly in the fall and deeply in the spring. Fit the same as for clover and pasture sod.

If there is danger of land washing in winter, plow in spring.

TIME OF PLANTING.

The time of planting varies according to the following conditions: (a) Whether the variety is an early or late maturing one; (b) whether the growing season in your section is long or short; (c) whether you are subject to a hot or dry summer season.

FERTILIZERS.

On good clover, alfalfa, or old pasture sod, fair crops may be grown without fertilizer, but in most cases fertilizers can be used with profit. Fertilizers may be grouped into two classes, natural and artificial.

Natural fertilizers are subdivided into (1) farmyard manures and (2) green-crop manures. The former may be used at the rate of from 10 to 20 two-horse loads per acre, preferably applied in the fall. If used in the spring it should be well rotted. Do not use farmyard manure on land infested with or subject to potato scab, as it favors the development of scab.

Green manuring consists in plowing under a green crop of clover, alfalfa, cowpeas, soy beans, or any other succulent plant. Its chief function is to improve the physical condition of the soil and increase its water-holding capacity. This method, of course, also adds considerable plant food.

Artificial or commercial fertilizers are of two kinds, mineral and organic.

Mineral fertilizers are represented by acid phosphate (dissolved rock), nitrate of soda, sulphate of ammonia, and various forms of potash.

The organic fertilizers are represented by bone meal, dried blood, tankage, and cottonseed meal.

A complete fertilizer is one which contains nitrogen, phosphoric acid, and potash.

A balanced fertilizer is one which contains the right proportions of nitrogen, phosphoric acid, and potash to properly nourish the plant to which it is applied.

The requirements of the potato plant vary according to whether it is to be grown for an early or a late crop. An early crop requires a quickly available form of nitrogen, while the late crop requires a more slowly available form. This is supplied by means of dried blood, tankage, or cottonseed meal.

EARLY CROP FERTILIZER.

An early crop fertilizer should contain from 5 to 7 per cent of nitrogen, from 6 to 8 per cent of phosphoric acid, and from 8 to 10 per cent of potash. Apply at the rate of from 800 to 1,500 pounds per acre, depending on the character of the soil.

LATE CROP FERTILIZER.

A late crop fertilizer should contain from 2 to 4.5 per cent of nitrogen, of which not over one-half should be derived from nitrate of soda or sulphate of ammonia, 6 to 8 per cent of phosphoric acid, and 8 to 10 per cent of potash. The sulphate of potash should be used in preference to the muriate of potash. Apply at the same rate as for an early crop. Clover or alfalfa sods require less nitrogen than pasture or stubble lands.

APPLICATION OF ARTIFICIAL FERTILIZERS.¹

Artificial fertilizer may be either applied broadcast before planting or distributed in the drill row at time of planting. In no case should it be allowed to come in contact with the seed.

¹ For fuller instructions, see Farmers' Bulletin 407, pp. 15-16.

SELECTION AND TREATMENT OF SEED.

Select tubers of uniform shape and of medium size. They should run from 4 to 8 ounces in weight. (See figs. 1, 2, and 3). Reject all that show any sign of disease.

Treat selected seed before cutting by immersing them for two hours in a solution containing one-half pint of formalin and 15 gallons of water. Use a fraction of this for smaller quantities of seed. This will kill all scab germs on the seed. Upon removal from the solution spread tubers out to dry.

SIZE OF SEED PIECE.

Cut seed into pieces containing from two to four eyes. A good-sized piece will, as a general rule, give a larger yield than a small one.

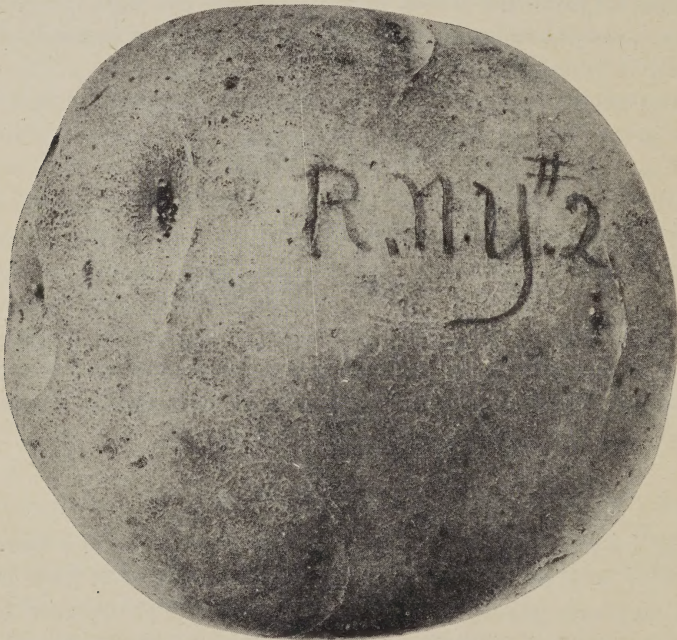


FIG. 1.—Ideal size and shape of Rural New Yorker No. 2 potato. (Natural size.)

Reject all seed showing brownish or blackish spots or rings in the flesh.

FRESH CUT SEED.

As a rule it is better to cut and plant the seed the same day. When the soil is hot and rather dry, however, it is advisable to cut the seed a day or two in advance of planting, provided it is spread out thinly in a shady place. Under these conditions the cut surface soon dries or heals over and further loss of moisture is prevented. Sprinkling fresh cut seed with land plaster partially answers the same purpose.

DEPTH AND RATE OF PLANTING.

Plant seed 4 inches deep in furrows or rows from 32 to 36 inches apart and from 10 to 18 inches apart in the row. The closer planting (10 by 32 inches) is recommended on lands well supplied with plant food and moisture. For the other extreme of soil conditions plant 18 by 36 inches. Cover seed as quickly as possible after planting.

CULTIVATION.¹

Begin cultivation a week or 10 days after planting by going over the plat with a weeder or a light harrow, the teeth of which have been slanted. Anything that will break the surface crust and keep down the weeds will serve the purpose.



FIG. 2.—Ideal size and shape of Green Mountain potato. (Natural size.)

As soon as the plants are up, start cultivation. The first cultivation should be as deep as possible, with each subsequent cultivation shallower than the preceding one.

Continue cultivation at intervals of from 5 to 10 days as long as it is possible to get through the rows without too much injury to the plants. In sections where the rainfall is abundant, ridging up seems to be desirable. Where the rainfall is light and the summer temperatures are high, little, if any, ridging is advisable.

¹ For further instructions, see Farmers' Bulletin 407, p. 16.

SPRAYING FOR INSECTS AND DISEASES.

Begin spraying plants with arsenate of lead, Paris green, or other poisons as soon as the potato beetle appears. When the plants are 8 or 10 inches high use a combination insecticide and fungicide by adding the poison to the Bordeaux mixture. These applications should be made often enough to keep the foliage well covered. Flea-beetle and fungous-disease injuries are very largely avoided if the foliage is well covered with Bordeaux mixture.

SPRAY PUMPS.

The simplest form of spray apparatus is the atomizer. This can be used only with very strong insecticidal mixtures and is at least not



FIG. 3.—Ideal size and shape of Pearl potato. (Natural size.) (Desirable stage of germination for planting.)

to be recommended for extensive spraying. The compressed-air knapsack sprayer is the next available form, and on small areas this makes a fairly satisfactory spray outfit. The barrel force pump comes next, followed by the various forms of gear-driven and gasoline-driven spray machines.¹

¹ For fuller information, see Farmers' Bulletin 407, pp. 11 and 12.

ARSENICAL AND FUNGICIDAL FORMULAS.

Poisons: (1) $1\frac{1}{2}$ pounds arsenate of lead, 25 gallons of water. (2) One-fourth pound Paris green, one-half pound lime,¹ 25 gallons water.

Fungicide Bordeaux² mixture: $2\frac{1}{2}$ pounds copper sulphate (blue vitriol), $2\frac{1}{2}$ pounds lime, 25 gallons water.

Dissolve the copper sulphate crystals in a wooden or earthen vessel, slake lime in another vessel, dilute both with 5 to 10 gallons water, and pour together in a third vessel, after which make up to 25 gallons.

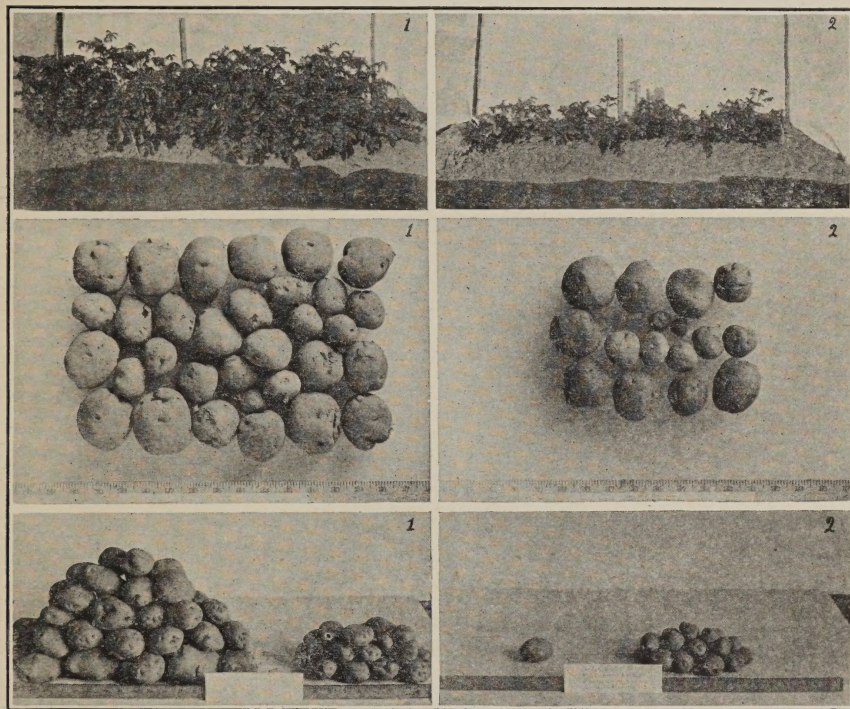


FIG. 4.—Strong (1) and weak (2) tuber units of Rural Blush potatoes. (Photograph of plants made about August 20, 1911.)

HARVESTING.

As a general thing it is desirable to harvest the crop as soon as the vines are dead. The crop ought always to be harvested before danger of severe freezing. In order that seed selection may be practiced, the club plat should be dug by hand, keeping the tubers from each plant separate. The tubers should be exposed to the light as little as possible, as light injures their table quality.

¹ Slake lime in small quantity of water before adding to the mixture.

² See directions for making Bordeaux mixture in Farmers' Bulletin 231. Also Farmers' Bulletin 407, p. 11.

SELECTION OF SEED FOR NEXT CROP.

Go over each row carefully and select as many choice hills as you can find, always keeping in mind the uniformity in size and shape of the tubers and the number of potatoes in the hill. Keep each selection separate. Handle the especially selected hills as outlined in Bureau of Plant Industry Circular 113, separate entitled "The Tuber-Unit Method of Seed-Potato Selection." Figure 4 illustrates in pictures marked 1, 1, 1 what happens when good tubers are used and in those marked 2, 2, 2 what happens when poor tubers are used for seed. From the remaining hills select enough medium-sized seed (3 to 8 ounces) from the most productive and uniform hills to plant the next season's crop.

GRADING POTATOES.

The crop should be graded in the field into merchantable stock and culls, the latter consisting of all rough, uneven, injured, or small tubers.

Slat crates are preferable to any other receptacle for handling the potatoes from field to storage.

If a fancy market is available or can be created, a further grading will oftentimes pay handsomely for the extra labor. By grading the tubers into different sizes and in groups having the same general shape—that is, all round, all oval, or all long—a much more attractive appearance is obtained and should command a much better price if put up in convenient-sized packages. For the city trade the 8-pound grape basket or the six-carrier peach basket might be used, provided light be excluded from the package.

STORING OR SHIPPING FROM FIELD.

Whether it is advisable to store or sell the crop at digging time depends very largely on the prevailing price at that time. If prices are reasonably good it is generally advisable to sell at once. The extra handling involved in storing and the shrinkage in weight through injuries, disease, and moisture loss will very often offset the increase in price that might be secured.

USE OF CULLS.

The culls may be fed to the hogs or cattle or manufactured into homemade potato starch. If fed to the hogs the culls should first be cooked. At present prices of foodstuffs they have a feeding value of about 20 cents per bushel.

*Recipe for homemade potato starch.*¹—Equipment needed: Two clean galvanized tubs, one large dish pan, one cylindrical grater, and plenty of water and wiping cloths.

Select 5 bushels of culls or other potatoes, preferably free from scab and surface blemishes. Wash them thoroughly by the use of plenty of water and a small scrubbing brush. All culls regardless of scab can be used for the manufacture of starch.

Use one tub for cleaning potatoes and the other for gratings. Seated in a convenient place between the two tubs, with dish pan and grater in the lap, without removing the skin, grate the clean potatoes from the right-hand tub into the dish pan, empty the pan of gratings when necessary into the well-cleaned tub on the left, and continue this operation until the left-hand tub is a trifle over half full. Pour clean water upon the potato gratings until the tub is nearly full and stir well so as to saturate every particle of pulp.

Remove all peelings and floating material from the top of the water and let it stand over night so that the starch will settle to the bottom and all pulp and potato skin will rise to the top of the water. In the morning the water should be carefully removed from the tub and the dark formation and sediment above the layer of starch should also be carefully taken out.

Again pour a fresh supply of water over the starch and stir so as to rinse all particles of starch well. Let it stand for about eight hours. Draw off the water from the top and remove the layer of sediment as before. In doing so be careful not to waste the starch.

Continue this process with new applications, carefully stirring and letting it stand each time, many times as it is necessary to effect a complete separation of starch from the pulp, peeling, and sediment of the potatoes. It will usually take four or five washings. By straining the gratings through cheesecloth the time usually required for the several washings can be saved.

Potato starch is a healthful food and can be used in at least a dozen different ways for food purposes in the making of puddings, salads, milk dishes, etc. It is both an easy and economical method of providing a valuable food product for the average home.

The potato water and wastes incident to the process can be easily utilized on the farm for hogs, poultry, and stock.

Try this as one of your potato-club experiments.

POTATO CROP ROTATIONS.

As a rule it is not advisable to grow potatoes oftener than once in three years on the same land. In the famous Aroostook County (Me.) potato section a favorite rotation is as follows: First year, potatoes; second year, oats, seeded to clover and other grasses; third year, hay rowen, to be plowed under in the fall and planted with potatoes the fourth season.

Where the seasons are long and a cover crop can be sown after harvesting the potatoes, a shorter rotation may be practiced, provided the soil does not become infected with diseases.

In sections where alfalfa is grown, a second crop of potatoes may follow the first, to be then followed with grain and alfalfa for four or five years. In all cases the kind of crop to be grown in the rotation and the length of the rotation system adopted is largely governed by geographical location.

¹ By O. H. Benson, specialist in charge of club work.

REQUIREMENTS FOR POTATO CLUB WORK.

Age: Ten to eighteen years, inclusive.

Acreage: One-eighth acre.

Basis of award.

(1) Greatest yield per one-eighth acre.....	40
(2) Best showing of profit on investment.....	30
(3) Best exhibit of 1 peck of seed potatoes.....	15
(4) Best history on "How I made my crop of potatoes".....	15
Total score.....	100

What club members should agree to do:

- (1) Attend, if possible, all field, local, and county meetings of instruction called by teacher, county superintendent, or club leader.
- (2) Follow carefully all club instructions, especially those relating to management of club plats, crop management, and sale and care of products.
- (3) Keep an accurate account of all items of expense, receipts, observations, and experiments in connection with the club plat. See your crop-report blank for instructions.
- (4) Make an exhibit of club products at district, county, or State fair or any other exhibition or contest of a club interest.
- (5) Fill out the regular crop-report blank with pen and forward the same correctly signed and attested to our State agent. If no State agent has been appointed, then forward the report direct to the United States Department of Agriculture, Office of Farm Management, Washington, D. C.
- (6) Give a written account on "How I made and used my crops." If convenient, give account in form of an illustrated booklet 9 by 11 inches. See special outline furnished by the Department of Agriculture.

